

I CLAIM:

1. A method for minimizing stress concentration points in metal and alloy surface cracks, scratches, gouges, machine tool marks, manufacturing irregularities, and holes especially at small radii by cleaning and application of an etch appropriate for the metal or alloy to minimize the stress intensity factor in tension, shear, or compression to thus mitigate or prevent crack propagation that can result in overstress failures, impaired flexibility without failure, and short fatigue life.

2. A process that employs the combination of an appropriate etch as described in Claim 1 and a corrosion preventive surface treatment as described in claim two to synergistically mitigate or prevent crack growth or propagation that therefore will result in increased strength, increased flexibility, and increased fatigue life.

3. A surface treatment using a corrosion preventive compound to mitigate or prevent corrosion reactions (primarily during tension, shear, or compression) at tips of metal and alloy surface cracks, scratches, gouges, machine tool marks or manufacturing imperfections to prevent crack growth at the said stress concentration points where the metal to metal bonds become energized with potential energy that can contribute to the activation energy required to cause a corrosive chemical reaction that may promote crack growth or propagation thus reducing the cross sectional area of the metal and loss of strength, restricted flexibility, and short fatigue life.